Positive and Negative Factors Influencing the Implementation of Relational Contracting in Public Construction Projects in Australia

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Abstract

Despite relational contracting (RC) having been used increasingly in public funded construction projects in some countries such as Australia, there are different perspectives and concerns about RC. This research aims to understand the perceptions of what makes RC attractive or otherwise as a contracting strategy for public construction projects using Australia for data collection. Literature review was used to identify relevant factors, which were incorporated into the survey questionnaire. An online questionnaire survey technique was used for primary data collection from the greater Sydney region. The survey response data was subjected to descriptive statistical analysis using SPSS software. The research results show that RC is perceived as attractive in terms of positive factors including "Improve design", "Improve quality of project", "Build up closer relationship with contracting parties", "Reduce time in delivering the project" and "Enhance the organization's reputation in the industry". The most negative aspects and factors included "Public sector accountability concerns", "Lack of training and guidance in relational arrangement", "Stringent public rules, regulations and laws", "Conservative industry culture inhibits changes and encourages preservation of the status quo", and "Concerns about opportunistic behaviour of other contracting parties". These negative factors may make RC arrangement less attractive. As the delivery of public facilities and services is exhibiting more RC behavioural patterns, this research suggests that at the early stage of preparing a business case, a clear and common understanding of the positive and negative factors surrounding RC by the parties involved, would provide a more informed basis for decision making.

Keywords: Relational Contracting, Public Construction Project, Success Factors, Sydney

1. Introduction

Relationships between project team members include formal liaisons and relational links. Formal contracts set out the rights, responsibilities and liabilities of the parties. But in a formal contract, parties act in an atomized manner, looking out for their own personal interests (Williamson, 1975). Relational contracting (RC) is based on recognition of mutual benefits and win-win scenarios through more cooperative relationships among contracting parties, and underpins various approaches, such as partnering, alliance, joint venturing, long term contracting, joint risk sharing mechanisms and other collaborative working arrangements (Rahman and Kumaraswamy, 2004a). RC allows mutual future planning and considers contracts to be relationships among the parties, in the process of projecting exchange into the future (Macneil, 1974). While RC principles are less difficult to apply in private sector projects (Kumaraswamy, 2010), it is not known if public sector projects can enjoy the full benefits of RC like to reduce risks, reduce costs, and achieve better performance (Akintoye and Main, 2007). This is because public clients are not in a position to offer any future relationships, since most projects must be procured through competitive bidding process (Rahman and Kumaraswamy, 2004b). Yet, public projects are highly visible, and need to achieve the basic triple project goals (time, cost, quality) because tax payers' money is involved. It is therefore worth investigating the feasibility of RC in public construction projects.

In Australia, project alliancing would be considered for delivering complex and high-risk infrastructure projects, while in other cases the traditional approaches to procurement would be used (NSW Procurement, 2010). The history of collaboration with private sectors in Australia government could be tracked back to 1999, when "C1999-31 Guidelines for Collaboration and Integrated Services" was issued. In 2006, the Department of Treasury and Finance in Victoria issued another guide titled "Project Alliance Practitioners' Guide". It was then replaced by the latest issue of "Practitioners' Guide to Alliance Contracting (Exposure Draft)", which was prepared in July 2010 to provide consistent and leading practice guidance on alliance contracting to Western Australian, Queensland, NSW and Victorian Government departments and agencies that develop and own infrastructure projects. Although RC has been used increasingly in public funded construction projects in Australia, there are different perspectives and concerns towards RC (Clifton et al., 2004). The paper aims to understand the perceptions of what makes RC attractive or otherwise as a contracting strategy for public construction projects in Australia.

2. Literature Review

RC can benefit clients, contractors, consultants and on-site employees, which has been highlighted in recent research publications. From the literature review of works by Akintoye and Main (2007), Chan et al. (2003a), Black et al. (2000), Li et al. (2001), Lu and Yan (2007) and others, 21 positive factors of RC were identified. The abovementioned literature mainly focused on the perception of RC approaches in general construction project. The applicability of these in public construction projects in Australia was tested in the field work.

Different parties working together in a project are required to commit themselves and it is very difficult to change to cooperative and collaborative thinking especially for contracting parties in public construction projects (Eriksson et al., 2008). Reason responsible for unsuccessful collaboration in construction is also a hot research topic. The works of Eriksson et al. (2008), Glagola and Sheedy (2002), Kumaraswamy et al. (2005), Chan et al. (2003b), Ng et al. (2002) and others were reviewed. 23 negative factors of RC were identified and subsequently tested in the fieldwork of public construction projects in Australia.

3. Data Collection and Analysis

A questionnaire survey is a research instrument consisting of a series of questions for the purpose of gathering information from respondents, which is appropriate for this study to investigate the perception towards RC. A structured questionnaire survey was therefore conducted between June and November 2011 in Sydney. The objectives of the survey were to evaluate the extent to which collaborative practices were present, observed, practised or emphasized in projects; and to assess the driving and impeding factors for adopting RC/collaborative practices. Public sector officials, private architects, engineers, quantity surveyors, project managers and contractors (as well as subcontractors), who had been involved in public construction projects, were targeted. Respondents were requested to provide data of a completed public sector project that they had been involved in.

Since there is no national registry of officials/firms involved in public construction projects, the size of the population is not known. The sampling frame for public officials was obtained from government directories. As the number of people in this group was not likely to be overwhelming, questionnaires were sent to all identified public officials. The sampling frame for private consultants and contractors was derived from the respective professional and trade institutions. Random sampling was used to select the samples from these identified groups. As this group may contain those who have not handled public projects, the questionnaire clearly stated that only those who had completed public projects should fill up the questionnaire. In total, 322 sets of survey invitations were sent out, and 30 valid completed questionnaires were returned.

The questionnaire included six sections (i.e. Section A - Characteristics of the Public Project/Facility, Section B - Practices Present, Observed, Practiced, or Emphasized in the Specific Project identified in Part A, Section C - Motives/Drivers to Adopt RC Practices, Section D - Impeding Factors to Adopt RC Practices, Section E - Other Suggestions and Comments on Implementing RC Practices, and Section F - General Information). This paper focuses on the findings relating to motives /drivers to adopt RC practices and impeding factors to adopt RC practices. Respondents were requested to rate their degree of agreement with each of the identified factors according to a five-point Likert scale (1=Strongly disagree; 3=Neither; 5=Strongly agree).

The data were analyzed using SPSS software. Main statistical methods were one-way ANOVA (used to test the hypothesis that viewpoints from different groups of respondents are equal) and One-Sample T Test (to test the hypothesis that the positive/negative factors are equal to 3). The significance level was set at 0.05.

The content validity has been addressed during the questionnaire development stage by an in-depth literature review and a pilot-test of the questionnaire based on inputs from 9 industry practitioners before the dispatch of questionnaire. Cronbach's alpha reliability test was adopted to examine the internal reliability. The Cronbach's alpha values of section C and D were 0.891 and 0.966, which were greater than 0.7 and therefore are acceptable (Nunnally, 1978).

The characteristics of the respondents are given in Table 1. Most of the respondents have rich construction experience. The number of years of respondents' experience ranged from 2 to 45 years with an average of 24 years. 72.4% of the respondents had no less than 15 years of experience. The respondents' firms engaged between 3 and 100000 employees with an average of 7037 employees. Results showed that 67.9% of the respondents' firms had greater than 200 employees.

Table 1: Background of respondents

Background		*Number*	*Percentage*
Number of years practiced in the construction industry	*< 5 years*	*6*	*20.7%*
	5-9 years	*1*	*3.4%*
	10-14 years	*1*	*3.4%*
	≥ 15 years	*21*	*72.4%*
	Average	*24*	
	Min	*2*	
	Max	*45*	
Organization type	*Government*	*9*	*31.0%*
	Engineering firm	*2*	*6.9%*
	Architectural firm	*1*	*3.4%*
	Quantity surveying firm	*1*	*3.4%*
	Contractor	*16*	*55.2%*
	Others	*0*	*0.0%*
Ownership of organization	*Public*	*16*	*55.2%*
	Private	*13*	*44.8%*
	Joint Venture	*0*	*0.0%*
Size of total workforce	*1-20 employees*	*2*	*7.1%*
	21-200 employees	*7*	*25.0%*
	> 200 employees	*19*	*67.9%*
	Average	*7037*	
	Min	*3*	
	Max	*100000*	

4. Results and Discussion

4.1 Positive Factors

An ANOVA analysis was conducted to evaluate the differences of the scores of positive factor among different contracting parties (i.e. clients, contractors and consultants). The results were shown in Table 2. There were no significant difference among the perspectives of clients, contractors and consultants, as all the significance values were greater than 0.05. A high extent of agreement was therefore valid among the three sets of ratings, to allow lumping the three sets of data together for the obvious reason of having a larger sample size. However, this may be due more to the limited number of respondents in this study than to the absence of differences among views from contracting parties. Marginal differences were observed in the "Respond to technology changes" ($p = 0.137$) and "Seize new market opportunities" ($p = 0.152$). The mean rating values for contractors (3.75) and consultants (3.91) on "Respond to technology changes" are higher than those of client respondents (2.80). Since design and construction are the responsibility of the contractors and consultants, it is important for that party to actively seek ways of increasing productivity and responding to technology changes. "Seize new market opportunities" is considered more important attraction by the contractors (3.83) than by the clients (2.80) and consultants (3.18).

Insert Table 2 here.

The means for positive factors were calculated as shown in Table 2. The mean values for the positive factors ranged from 3.36 to 4.41. This observation has reflected a high degree of agreement on the positive factors from the respondents. According to the One-Sample T Test against 3, 19 out of 21 positive factors were significantly greater than 3, as their significance values were less than 0.05. This again reinforces that RC principles are of great benefit to public construction projects. Table 2 shows that the significant positive factors rated highest by respondents could be categorised into two categories, i.e. improvement of project performance and self-improvement.

Positive factors to improve project performance include "Improve the design" (1^{st}), "Improve the quality of project" (2^{nd}), "Reduce time in delivering the project" (4^{th}), "Reduce disputes during the project" (6^{th}), "Reduce risks and/or mitigate their influence" (7^{th}) and "Achieve better safety performance" (8^{th}). Performance improvement is the primary objective in the introduction of RC principles in public construction projects. Clearly, this result could therefore have been anticipated.

The other main category of positive factor is self-improvement, including "Build up closer relationship with contracting parties" (3^{rd}), "Enhance your organization's reputation in the industry" (5^{th}) and "Improve your organization's competency" (9^{th}). The attractiveness of RC in self-improvement is recognised by the respondents. It appears that respondents are aware of the need for their organizations to demonstrate continuous improvement in order to get more work in future.

4.2 Negative Factors

An ANOVA analysis was conducted to evaluate the differences of the scores of negative factor among different contracting parties (i.e. clients, contractors and consultants). The results were shown in Table 3. There were no significant difference among the perspectives of clients, contractors and consultants, as all the significance values were greater than 0.05. A high extent of agreement was therefore valid among the three sets of ratings, to allow lumping the three sets of data together for the obvious reason of having a larger sample size.

Insert Table 3 here.

Table 3 presents the means of negative factors calculated. The mean values ranged from 2.23 to 3.42. This observation has reflected a low degree of agreement on the negative factors from the respondents. According to the One-Sample T Test against 3, only 1 out of 23 negative factors was significantly greater than 3; while 2 negative factors were significantly less than 3. One explanation may be the survey limitation of natural inclination on negative factors of respondents to avoid extremes of subjective opinion rather than the absence of any extremely important factors. Yet, to some extent, these could still reinforce the high possibility to apply RC practices in public construction projects, as negative factors are not recognised as significantly important.

The only negative factor significantly greater than 3 was "Public sector accountability concerns" (3.42). It is worth noting that the mean value from clients for this negative factor was 4.00. The implication is that concerns of public sector accountability should be considered in order to pave the way to implementation of RC in public construction projects. The two negative factors significantly less than 3 are "Lack of top management support (each party)" and "Unenthusiastic participation of contracting parties". These may be because contracting parties think they have presented great support and participation of RC practices. Another explanation is that respondents may overestimate their participation and performance in the projects.

The top negative factors comprised "Public sector accountability concerns" (1^{st}), "Lack of training and guidance in the relational arrangement" (2^{nd}), "Stringent public rules, regulations and laws" (3^{rd}), "Conservative industry culture inhibits changes and encourages preservation of the status quo" (4^{th}) and "Concerns about opportunistic behavior of other contracting parties" (5^{th}). It is obvious that all the top negative factors were related to macro public environment and culture. It therefore greatly relies on the efforts from the government and may take a long time to overcome the macro level of barriers. For example, given that construction is a project-based industry where time and scope are seen in a narrow perspective, it may take a long time before cooperative relationships result in continual improvement and increased profitability (Ingirige and Sexton, 2006).

Other negative factors no less than 3 included "Lack of knowledge of relational approaches" (6^{th}), "Lack of experience of relational arrangement" (7^{th}) and "Time required to develop relationship" (8^{th}). These were considered as organizational level of barriers. This is consistent with Eriksson et al. (2008) in Swedish construction industry which identified three types of negative factors to RC: i.e. cultural, organizational and industrial barriers.

5. Conclusions

The relative importance of 21 RC positive attractiveness factors was investigated through a survey conducted in Sydney. The results show that projects adopting RC principles exhibit positive attractiveness because of their possible ability to improve project performance as well as their organizations. However, RC concept is not totally accepted in all public construction projects. Among the 23 potentially negative factors, which might cause potential participants to reconsider their involvement, the factors with a mean value no less than 3 could be categorized into macro and organizational levels of barriers. The observation of high agreement on positive factors and low agreement on negative factors may indicate the great potential to apply RC principles in public construction projects.

It is recommended that these factors, representing the positive and negative characteristics exhibited in RC procurement, should be considered by public sector clients, and by potential private sector business case developers.

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Table 2: Statistical results of positive factors

No.	*Positive Factors*	*Mean*	*T*	*Sig.*	*Rank*	*Client*	*Contractor*	*Consultant*	*F Value*	*Sig.*
C-1	*Reduce total project cost*	*3.96*	*6.854*	*0.000**	*11*	*4.00*	*3.92*	*4.00*	*0.040*	*0.961*
C-2	*Reduce risks and/or mitigate their influence*	*4.14*	*8.000*	*0.000**	*7*	*4.00*	*4.25*	*4.09*	*0.222*	*0.802*
C-3	*Reduce the cost of changing partner in projects*	*3.50*	*2.201*	*0.036**	*18*	*4.00*	*3.67*	*3.09*	*1.203*	*0.317*
C-4	*Reduce time in delivering the project*	*4.21*	*7.718*	*0.000**	*4*	*4.20*	*4.17*	*4.27*	*0.044*	*0.957*
C-5	*Reduce public client's administration burden*	*3.54*	*3.382*	*0.002**	*17*	*3.80*	*3.67*	*3.27*	*0.932*	*0.407*
C-6	*Provide an integrated solution of efficiency improvement*	*3.89*	*6.408*	*0.000**	*14*	*4.00*	*3.75*	*4.00*	*0.376*	*0.690*
C-7	*Improve the quality of project*	*4.32*	*9.674*	*0.000**	*2*	*4.20*	*4.08*	*4.64*	*1.881*	*0.173*
C-8	*Improve the design*	*4.41*	*11.498*	*0.000**	*1*	*4.20*	*4.36*	*4.55*	*0.531*	*0.595*
C-9	*Respond to technology changes*	*3.64*	*3.204*	*0.003**	*16*	*2.80*	*3.75*	*3.91*	*2.152*	*0.137*
C-10	*Achieve better safety performance*	*4.14*	*8.000*	*0.000**	*8*	*4.20*	*4.17*	*4.09*	*0.043*	*0.958*
C-11	*Facilitate creative and innovative approaches*	*3.96*	*6.437*	*0.000**	*12*	*4.00*	*3.83*	*4.09*	*0.293*	*0.749*
C-12	*Enhance your organization's reputation in the industry*	*4.18*	*6.600*	*0.000**	*5*	*4.20*	*4.17*	*4.18*	*0.002*	*0.998*
C-13	*Improve your organization's competency*	*4.11*	*6.392*	*0.000**	*9*	*3.80*	*4.00*	*4.36*	*0.781*	*0.469*
C-14	*Reduce disputes during the project*	*4.18*	*10.193*	*0.000**	*6*	*4.00*	*4.17*	*4.27*	*0.328*	*0.723*
C-15	*Build up closer relationship with contracting parties*	*4.25*	*9.442*	*0.000**	*3*	*3.80*	*4.33*	*4.36*	*1.288*	*0.293*

No.	*Positive Factors*	*Mean*	*T*	*Sig.*	*Rank*	*Client*	*Contractor*	*Consultant*	*F Value*	*Sig.*
C-16	*Maximize resource utilization*	*4.04*	*6.914*	*0.000**	*10*	*4.20*	*4.08*	*3.91*	*0.255*	*0.777*
C-17	*Respond to collaborative culture in the project*	*3.96*	*6.437*	*0.000**	*13*	*3.60*	*4.00*	*4.09*	*0.664*	*0.524*
C-18	*Seize new market opportunities (eg. pursuing future relationships)*	*3.39*	*1.890*	*0.070*	*20*	*2.80*	*3.83*	*3.18*	*2.035*	*0.152*
C-19	*Achieve continuity with prior developments*	*3.50*	*2.750*	*0.011**	*19*	*3.00*	*3.83*	*3.36*	*1.569*	*0.228*
C-20	*Respond to competitors' actions (enhance competitive position)*	*3.36*	*1.842*	*0.077*	*21*	*3.00*	*3.67*	*3.18*	*1.010*	*0.379*
C-21	*Respond to public/social/end-users' needs*	*3.68*	*3.968*	*0.000**	*15*	*3.80*	*3.67*	*3.64*	*0.054*	*0.948*

Table 3: Statistical results of negative factors

No.	*Negative Factors*	*Mean*	*T*	*Sig.*	*Rank*	*Client*	*Contractor*	*Consultant*	*F Value*	*Sig.*
D-1	*Lack of knowledge of relational approaches*	*3.04*	*0.176*	*0.862*	*6*	*3.00*	*3.20*	*2.91*	*0.171*	*0.844*
D-2	*Public sector accountability concerns*	*3.42*	*2.101*	*0.046**	*1*	*4.00*	*3.30*	*3.27*	*0.978*	*0.391*
D-3	*Lack of training and guidance in the relational arrangement*	*3.31*	*1.443*	*0.161*	*2*	*3.80*	*3.30*	*3.09*	*0.715*	*0.500*
D-4	*Lack of trust among all contracting parties*	*2.77*	*-0.881*	*0.387*	*12*	*2.80*	*2.90*	*2.64*	*0.096*	*0.909*
D-5	*Past negative experience of relational arrangement*	*2.73*	*-1.193*	*0.244*	*15*	*2.40*	*2.80*	*2.82*	*0.241*	*0.788*
D-6	*Lack of experience of relational arrangement*	*3.00*	*0.000*	*1.000*	*7*	*3.20*	*2.90*	*3.00*	*0.092*	*0.913*
D-7	*Misgiving about potential future relationships*	*2.77*	*-1.063*	*0.298*	*13*	*2.80*	*2.90*	*2.64*	*0.141*	*0.870*
D-8	*Lack of empowerment in the client's representatives*	*2.69*	*-1.248*	*0.224*	*18*	*2.80*	*3.00*	*2.36*	*0.675*	*0.519*
D-9	*Unenthusiastic participation of contracting parties*	*2.23*	*-3.801*	*0.001**	*23*	*2.00*	*2.50*	*2.09*	*0.546*	*0.587*
D-10	*Lack of top management support (each party)*	*2.38*	*-2.476*	*0.020**	*22*	*2.20*	*2.50*	*2.36*	*0.089*	*0.915*
D-11	*Lack of client's initiatives in RC practice*	*2.73*	*-1.158*	*0.258*	*16*	*2.40*	*3.00*	*2.64*	*0.467*	*0.633*
D-12	*Bureaucratic public client organization*	*2.96*	*-0.171*	*0.866*	*9*	*2.60*	*3.10*	*3.00*	*0.309*	*0.737*
D-13	*Lack of common goals among*	*2.50*	*-1.830*	*0.079*	*21*	*2.60*	*2.60*	*2.36*	*0.085*	*0.919*

No.	Negative Factors	Mean	T	Sig.	Rank	Client	Contractor	Consultant	F Value	Sig.
	contracting parties									
D-14	Stringent public rules, regulations and laws	3.08	0.328	0.746	3	2.60	3.10	3.27	0.525	0.599
D-15	Lack of acceptance by contracting parties of relational approaches as a long-term way of doing business	2.77	-1.140	0.265	14	2.60	3.10	2.55	0.828	0.449
D-16	Inter-personal/cultural clash (individual level)	2.73	-1.070	0.295	17	2.40	2.70	2.91	0.259	0.774
D-17	Need to avoid possible allegations of corruption arising from close relationships between client and other contracting parties	2.85	-0.582	0.566	11	2.40	2.80	3.09	0.441	0.649
D-18	Conservative industry culture inhibits changes and encourages preservation of the status quo	3.08	0.348	0.731	4	3.00	3.30	2.91	0.310	0.736
D-19	Concerns about opportunistic behavior of other contracting parties	3.08	0.359	0.723	5	3.00	3.00	3.18	0.081	0.922
D-20	Incompatible organizational cultures in the contracting parties	2.69	-1.355	0.188	19	2.80	2.50	2.82	0.210	0.812
D-21	High cost to adopt relational approaches	2.69	-1.316	0.200	20	2.60	2.70	2.73	0.018	0.982
D-22	Time required to develop relationship	3.00	0.000	1.000	8	3.40	2.90	2.91	0.265	0.770
D-23	Client only has occasional need for project development	2.88	-0.486	0.631	10	3.00	3.20	2.55	0.779	0.470